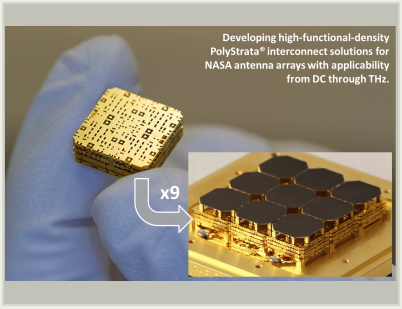
Robust Microfabricated Interconnect Technologies: DC to THz, Phase I

Completed Technology Project (2015 - 2015)

Project Introduction

In recent years, Nuvotronics has developed state-of-the art antenna array and SSPA technologies at microwave and mmW frequencies with NASA funding through the SBIR programs and other technology development sources for remote sensing applications. Examples include a broadband aperture for measuring snow water equivalent for the Snow and Cold Land Process (SCLP) mission, and active electronically scanned array modules at W-band for characterization of cloud properties for the Aerosol, Cloud and Ecosystems (ACE) mission. At the core of these innovations is the Nuvotronics' proprietary PolyStrata® additive microfabrication process, which is tailored specifically for meeting modern day needs for highly integrated, low-loss interconnect technologies. The overall program goal is to provide a new set of PolyStrata interconnect solutions for active arrays with applicability from DC through THz. Interconnect solutions will be developed with a clear path forward for inserting the developed technologies into instruments for future NASA missions for which hardware is presently being developed which leverages the PolyStrata technology. Proposed solutions will enable highly integrated, low loss feed networks that integrate microwave passives in a compact package to support the desired capabilities. Robust interconnects with broadband performance and high power handling will be developed to enable high-yield antenna array assemblies with increased functional density. Interconnect solutions for interfacing T/R modules with radiating arrays in both slat-style and panel-style architectures will be explored. An emphasis will be placed on manufacturability as well as thermal characteristics for high-power transmit applications. Designs will be validated with prototype hardware fabricated during Phase I in the PolyStrata process. PolyStrata test articles will be tested at high power levels with a thermocouple for temperature monitoring during RF test.



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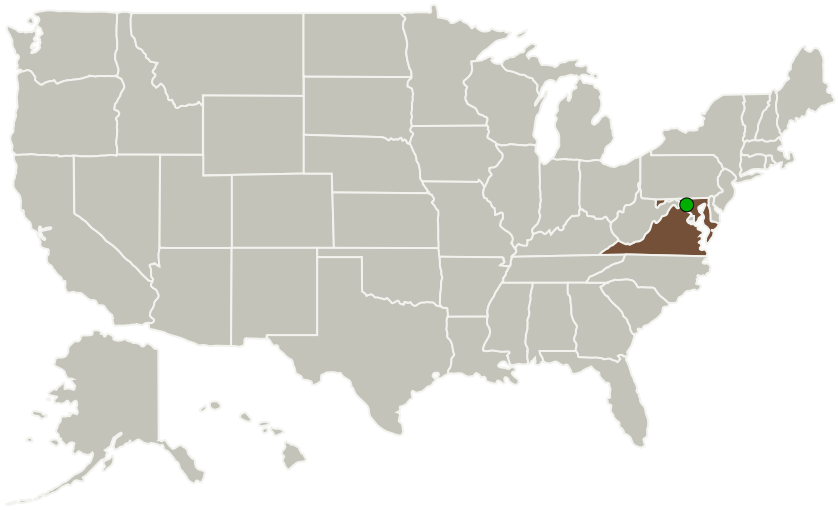
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Nuvotronics, Inc	Lead Organization	Industry	Radford, Virginia
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Virginia

Project Transitions

June 2015: Project Start

December 2015: Closed out

Closeout Summary: Robust microfabricated interconnect technologies: DC to T Hz, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/139295)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Nuvotronics, Inc

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Scott A Meller

Co-Investigator:

Benjamin W Cannon

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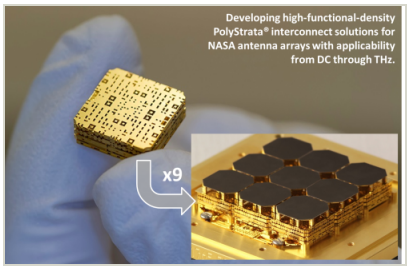
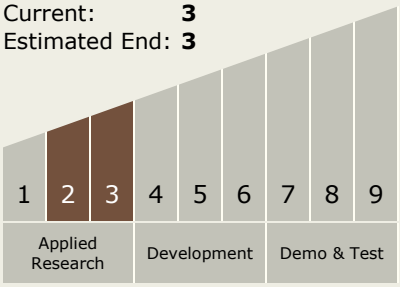
Images



Briefing Chart Image
Robust microfabricated interconnect technologies: DC to THz, Phase I
(https://techport.nasa.gov/image/135107)

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System